

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
22 January 2004 (22.01.2004)

PCT

(10) International Publication Number  
WO 2004/007775 A2

(51) International Patent Classification<sup>7</sup>: C21B 13/00, C21C 5/56, C22B 5/10, 7/00, 9/10

(21) International Application Number: PCT/GB2003/003065

(22) International Filing Date: 15 July 2003 (15.07.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data: 0216484.6 15 July 2002 (15.07.2002) GB

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

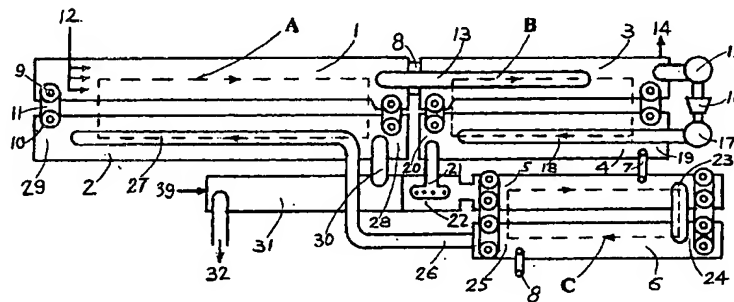
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Published:  
— without international search report and to be republished upon receipt of that report

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: DIRECT PRODUCTION OF REFINED METALS AND ALLOYS



(57) Abstract: The present invention provides a method of reducing metal oxide material to metal comprising the steps of forcibly circulating molten carrier material in a closed loop path serially through a charge reduction zone on one arm of the loop, a combined melt desulphurisation zone and post combustion or heating zone on the other, reducing said metal oxide to solid metal by the carbonaceous material contained within a mixed composite charge of the metal oxide, carbonaceous reductant and flux in said reduction zone, the metal oxide and carbonaceous reductant being utilised in proportions such that the carbon from the carbonaceous reductant is converted to carbon monoxide; reacting carbon monoxide with oxygen in the refining loops downstream from the reduction loop before being combusted to completion in the heating zone at the surface of the molten carrier material so that heat generated by the reaction is transferred to the molten carrier material which is circulated to the reduction zone; separating a metallised raft from said molten carrier material by projecting said metallised raft along into the first refining loop by virtue of the drag force exerted on the metallised raft by the circulating carrier material before the molten carrier material is circulated to the heating zone so that the surface of the molten carrier material which is circulated to the heating zone is substantially free of solid material.